PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44*bis*)

Applicant's or agent's file reference YS4511PC	**FOR FURTHER ACTION**	See item 4 below
International application No. PCT/JP2004/013113	International filing date *(day/month/year)* 09 September 2004 (09.09.2004)	Priority date *(day/month/year)* 12 September 2003 (12.09.2003)
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237		
Applicant YAMAKAWA SANGYO CO.,LTD.		

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 *bis*.1(a).

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

   In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

☒	Box No. I	Basis of the report
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☐	Box No. VIII	Certain observations on the international application

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44*bis*.3(c) and 93*bis*.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44*bis* .2).

	Date of issuance of this report 26 June 2006 (26.06.2006)
The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No. +41 22 338 82 70	Authorized officer Yoshiko Kuwahara e-mail: pt07@wipo.int

Form PCT/IB/373 (January 2004)

PATENT COOPERATION TREATY

TRANSLATION

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

	Date of mailing *(day/month/year)*
Applicant's or agent's file reference **YS4511PC**	**FOR FURTHER ACTION** See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/JP2004/013113	**09.09.2004**	**12.09.2003**

International Patent Classification (IPC) or both national classification and IPC

Applicant
YAMAKAWA SANGYO CO.,LTD.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I — Basis of the opinion
- ☐ Box No. II — Priority
- ☐ Box No. III — Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV — Lack of unity of invention
- ☒ Box No. V — Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI — Certain documents cited
- ☐ Box No. VII — Certain defects in the international application
- ☐ Box No. VIII — Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/JP	Authorized officer
Facsimile No.	Telephone No.

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/JP2004/013113

Box No. I Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

   ☐ This opinion has been established on the basis of a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of international search (under Rule 12.3 and 23.1(b)).

2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

   a. type of material

      ☐ a sequence listing

      ☐ table(s) related to the sequence listing

   b. format of material

      ☐ in written format

      ☐ in computer readable form

   c. time of filing/furnishing

      ☐ contained in the international application as filed.

      ☐ filed together with the international application in computer readable form.

      ☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/JP2004/013113

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-7	YES
	Claims		NO
Inventive step (IS)	Claims		YES
	Claims	1-7	NO
Industrial applicability (IA)	Claims	1-7	YES
	Claims		NO

2. Citations and explanations:

Documents listed in the international search report are numbered below from "document 1" to "document 5."

Document 1: JP 11-277220 A (Nisshin Steel Co., Ltd.) 12 October 1999, claim 1; Par. Nos. 0016 to 0025 (Family: none)
Document 2: JP 7-251261 A (Yamakawa Sangyo Kabushiki Kaisha) 03 October 1995, Figure 2; Claims 1 to 4; Par. No. 0010, table 4 (Family: none)
Document 3: JP 2000-317625 A (Yamakawa Sangyo Kabushiki Kaisha) 21 November 2000, Par. Nos. 0022 to 0028 (Family: none)
Document 4: JP 11-300468 A (Kobe Steel Ltd.) 02 November 1999, Par. Nos. 0017 to 0025 (Family: none)
Document 5: JP 8-90214 A (Aichi Steel Works Ltd.) 09 April 1996, claim 1; table 1 (Family: none)

1. Claims 1, 2, and 5

Documents 1 and 2 describe the inventions of claims 1, 2, and 5, and therefore these inventions lack an inventive step.

More specifically, document 1 describes a nozzle filler material comprising silica sand with an SiO_2 content of 96.0 wt% (table 1), chromium ore, feldspar, and carbon. Document 1 also discloses that the nozzle filler material wherein the alkali metal oxides contained in the silica sand and feldspar range from 0.3 to 2.0 wt%, the grain size distribution of the silica sand is 850 μm, the grain size distribution of the chromium ore is 212 μm, and the grain size distribution of the feldspar is 850 μm (Par. No. 0023).

In addition, document 2 discloses a sliding nozzle filler material comprising 100% silica sand having a grain size distribution ranging from 0.3 to 1.7 mm, a grain size coefficient ranging from 1.2 to 1.4, and an SiO_2 content of 97.18%. Paragraph 0010 in particular discloses that because the fired layer of the above filler material is no thicker than necessary, the sum of the content of K2O and Na2O contained in the above silica sand, i.e., the total alkali content of the silica sand, is 0.5 wt% or less, and it suggests that this alkali component originates in the feldspar.

This being the case, although the chromium ore is greater in the mix ratio of silica sand and chromium ore in the invention disclosed in document 1, because it is publicly known that chromium ore forms hexavalent chromium under high temperatures and the use thereof is undesirable. Furthermore, as disclosed in document 2, because a nozzle filler material comprising feldspar and silica sand that does not contain chromium ore, this authority finds

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: Box V.

that adjusting the mix ratio of silica sand and chromium ore in the invention described in document 1 so that the amount of chromium or is smaller and determining the ratios thereof does not present any particular difficulty to persons skilled in the art.

2. Claim 3

Documents 1-3 describe the invention of claim 3, and therefore this invention lacks an inventive step.

More specifically, document 3 discloses giving an electrostatic coat to a nozzle filler material with carbon black, and this authority finds that this matter does not present any particular difficulty to persons skilled in the art.

3. Claim 4

Documents 1-3 describe the invention of claim 4, and therefore this invention lacks an inventive step.

More specifically, this authority finds that using potassium feldspar as the feldspar does not present any particular difficulty to persons skilled in the art.

4. Claims 6 and 7

Documents 1-4 describe the inventions of claims 6 and 7, and therefore these inventions lack an inventive step.

Especially table 1 of document 4 discloses a filler material comprising chromite and silica sand wherein the ratio of chromite with a grain size distribution ranging from 0.075 to 0.7 mm is 99.7% and the ratio with a grain size distribution less than 0.75 mm is 0.3%. Especially Table 4 of document 2 discloses silica sand wherein the ratio of silica sand with grain size distribution ranging from 0.30 to 1.70 mm is 100%. Based on the above, this authority finds that persons skilled in the art can easily achieve the inventions of claims 6 and 7.

Document 5 also discloses a filler material for a sliding nozzle comprising zirconium sane, silica sand, and feldspar wherein the alkali content is specified.